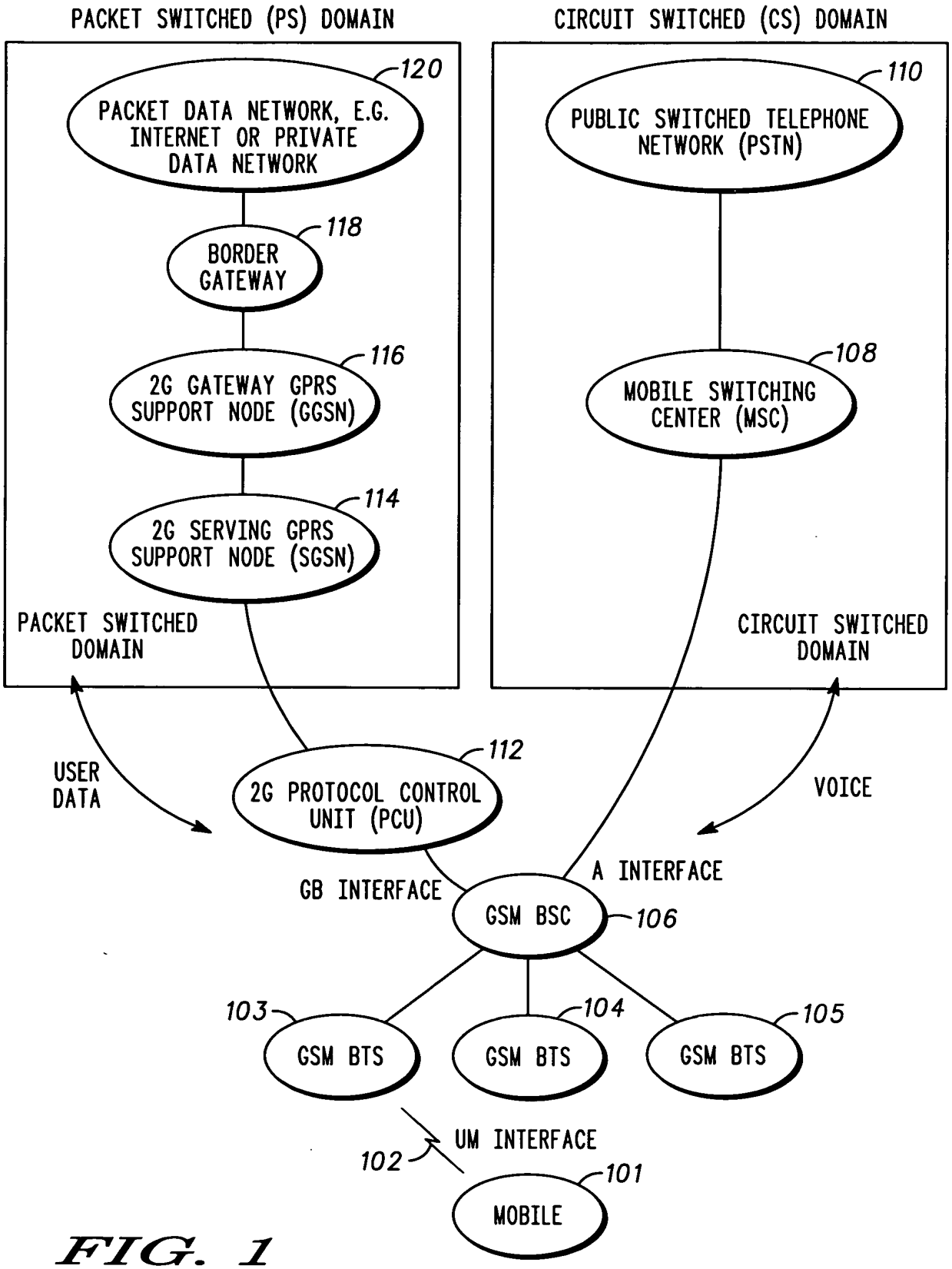
PACKET SWITCHED (PS) DOMAIN
CIRCUIT SWITCHED (CS) DOMAIN
120
PACKET DATA NETWORK, E.G. INTERNET OR PRIVATE DATA NETWORK
110
PUBLIC SWITCHED TELEPHONE NETWORK (PSTN)
118
BORDER GATEWAY
116
2G GATEWAY GPRS SUPPORT NODE (GGSN)
108
MOBILE SWITCHING CENTER (MSC)
114
2G SERVING GPRS SUPPORT NODE (SGSN)
PACKET SWITCHED DOMAIN
CIRCUIT SWITCHED DOMAIN
USER DATA
112
2G PROTOCOL CONTROL UNIT (PCU)
VOICE
GB INTERFACE
A INTERFACE
GSM BSC
106
103
GSM BTS
104
GSM BTS
105
GSM BTS
UM INTERFACE
102
101
MOBILE

FIG. 1

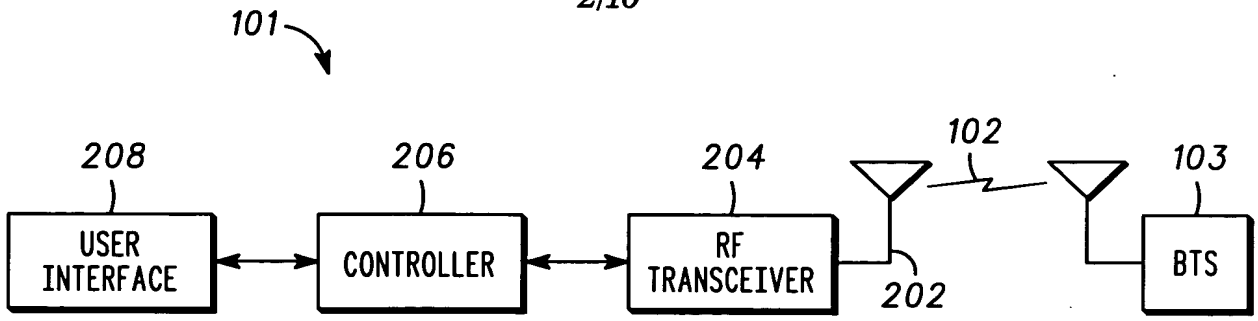
101
208
206
204
102
103
USER INTERFACE
CONTROLLER
RF TRANSCEIVER
202
BTS

FIG. 2

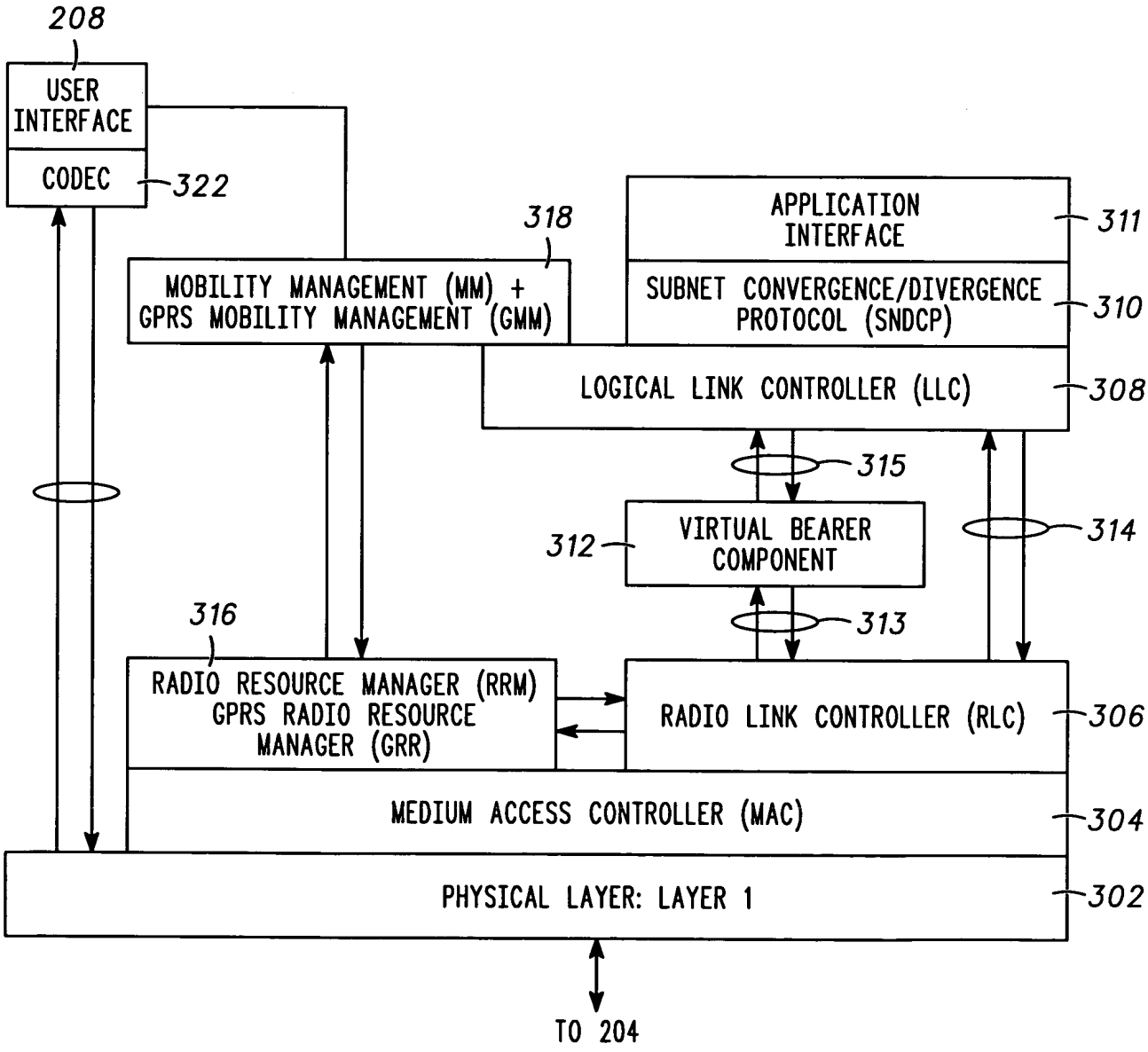
208
USER INTERFACE
CODEC
322
318
MOBILITY MANAGEMENT (MM) + GPRS MOBILITY MANAGEMENT (GMM)
APPLICATION INTERFACE
311
SUBNET CONVERGENCE/DIVERGENCE PROTOCOL (SNDCP)
310
LOGICAL LINK CONTROLLER (LLC)
308
315
312
VIRTUAL BEARER COMPONENT
314
316
313
RADIO RESOURCE MANAGER (RRM) GPRS RADIO RESOURCE MANAGER (GRR)
RADIO LINK CONTROLLER (RLC)
306
MEDIUM ACCESS CONTROLLER (MAC)
304
PHYSICAL LAYER: LAYER 1
302
TO 204

FIG. 3

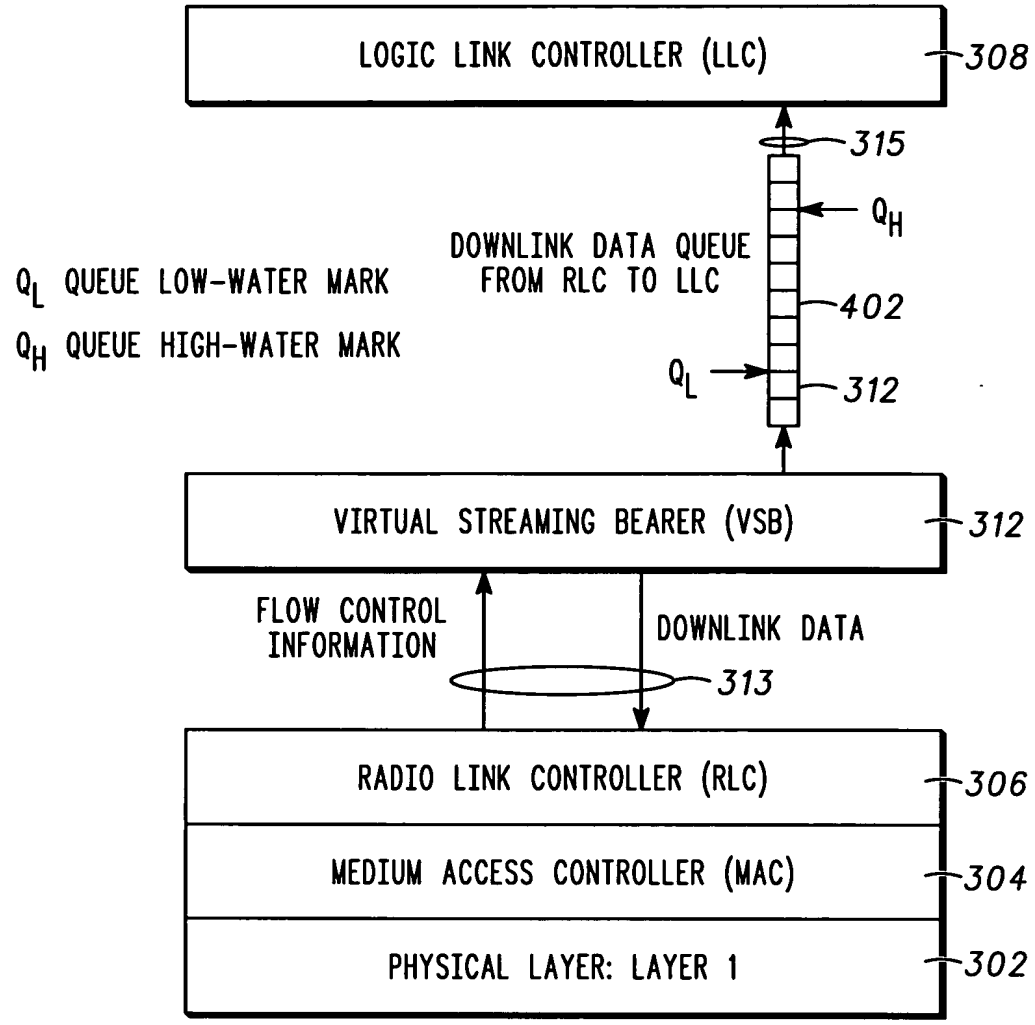
LOGIC LINK CONTROLLER (LLC)
308
315
Q_H
DOWNLINK DATA QUEUE FROM RLC TO LLC
Q_L QUEUE LOW-WATER MARK
Q_H QUEUE HIGH-WATER MARK
402
Q_L
312
VIRTUAL STREAMING BEARER (VSB)
312
FLOW CONTROL INFORMATION
DOWNLINK DATA
313
RADIO LINK CONTROLLER (RLC)
306
MEDIUM ACCESS CONTROLLER (MAC)
304
PHYSICAL LAYER: LAYER 1
302

FIG. 4

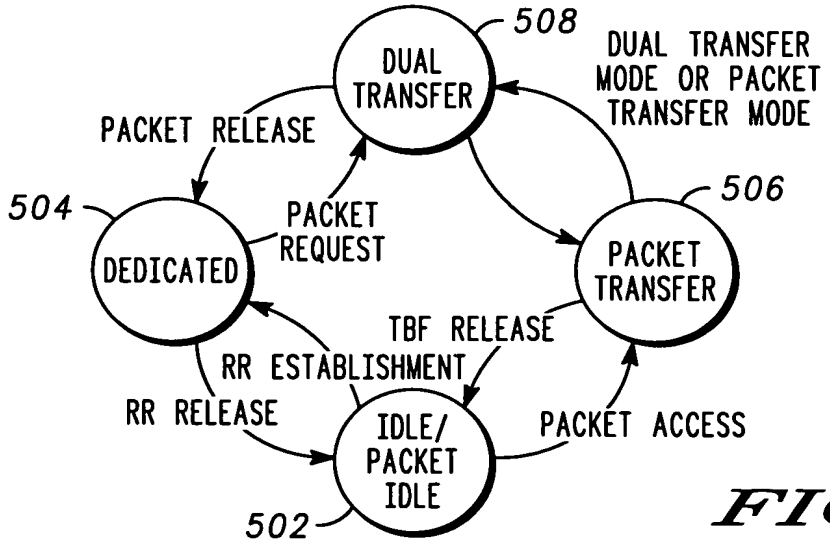
508
DUAL TRANSFER
DUAL TRANSFER MODE OR PACKET TRANSFER MODE
PACKET RELEASE
504
PACKET REQUEST
506
DEDICATED
PACKET TRANSFER
TBF RELEASE
RR ESTABLISHMENT
RR RELEASE
IDLE/ PACKET IDLE
PACKET ACCESS
502

FIG. 5

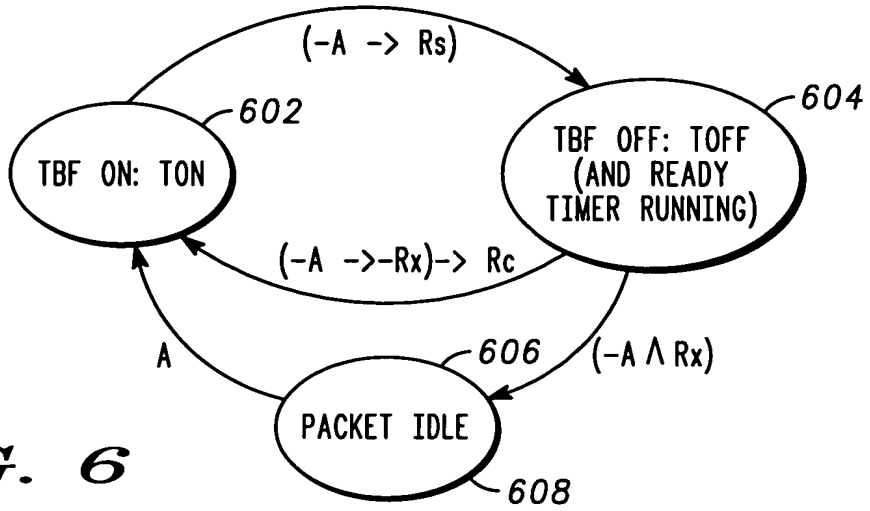

FIG. 6

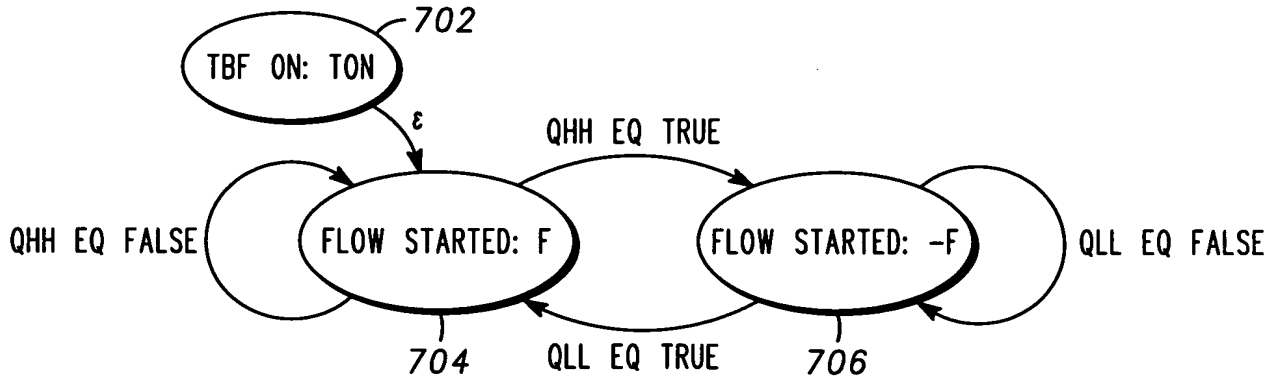

FIG. 7

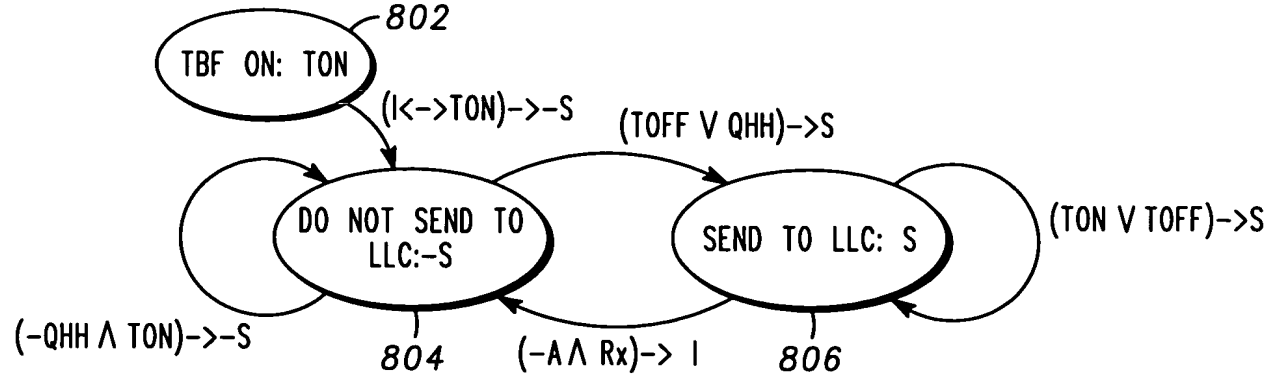

FIG. 8

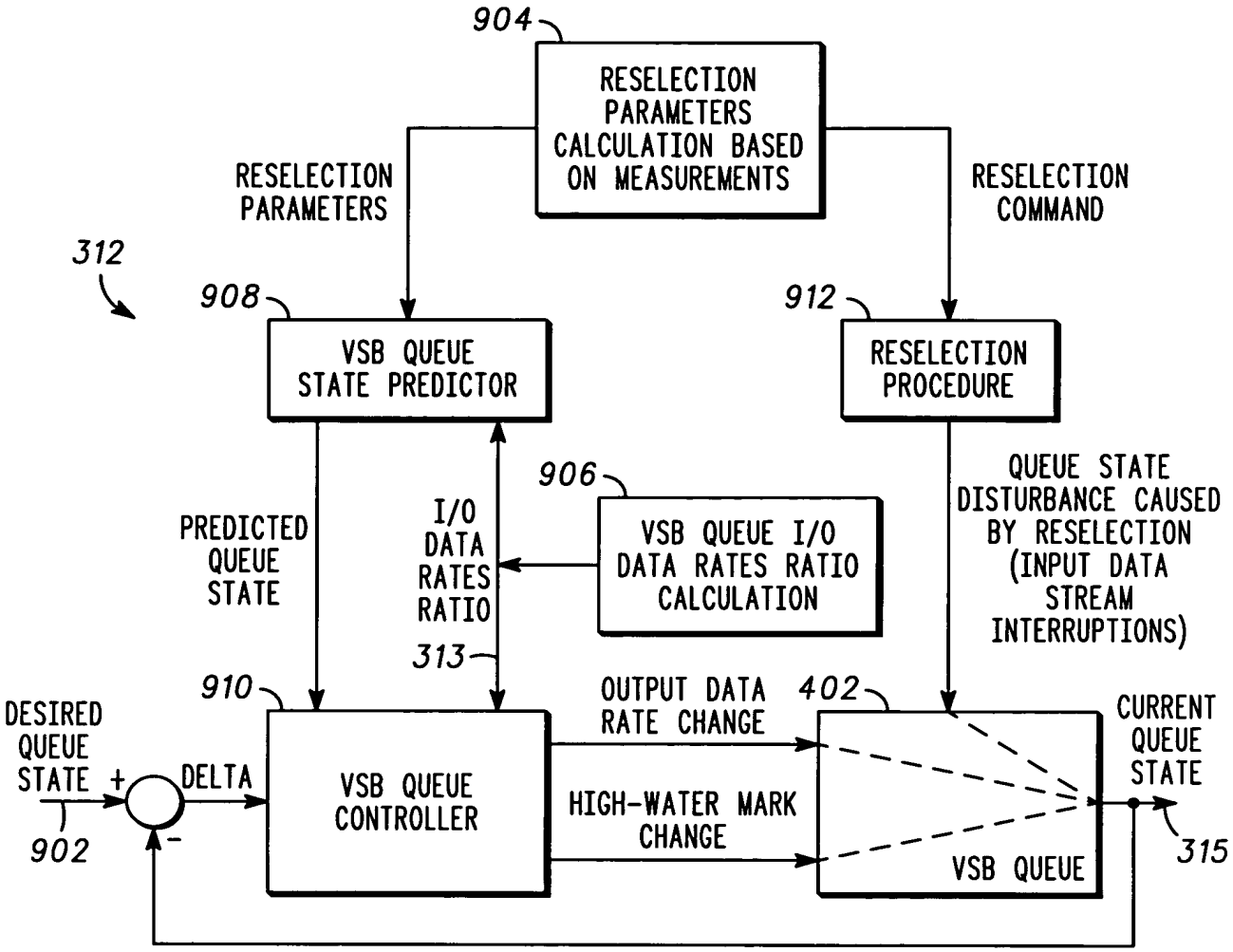
904
RESELECTION PARAMETERS CALCULATION BASED ON MEASUREMENTS
RESELECTION PARAMETERS
RESELECTION COMMAND
312
908
VSB QUEUE STATE PREDICTOR
912
RESELECTION PROCEDURE
906
VSB QUEUE I/O DATA RATES RATIO CALCULATION
PREDICTED QUEUE STATE
I/O DATA RATES RATIO
313
QUEUE STATE DISTURBANCE CAUSED BY RESELECTION (INPUT DATA STREAM INTERRUPTIONS)
910
OUTPUT DATA RATE CHANGE
402
DESIRED QUEUE STATE
+
DELTA
VSB QUEUE CONTROLLER
HIGH-WATER MARK CHANGE
CURRENT QUEUE STATE
902
-
VSB QUEUE
315

FIG. 9

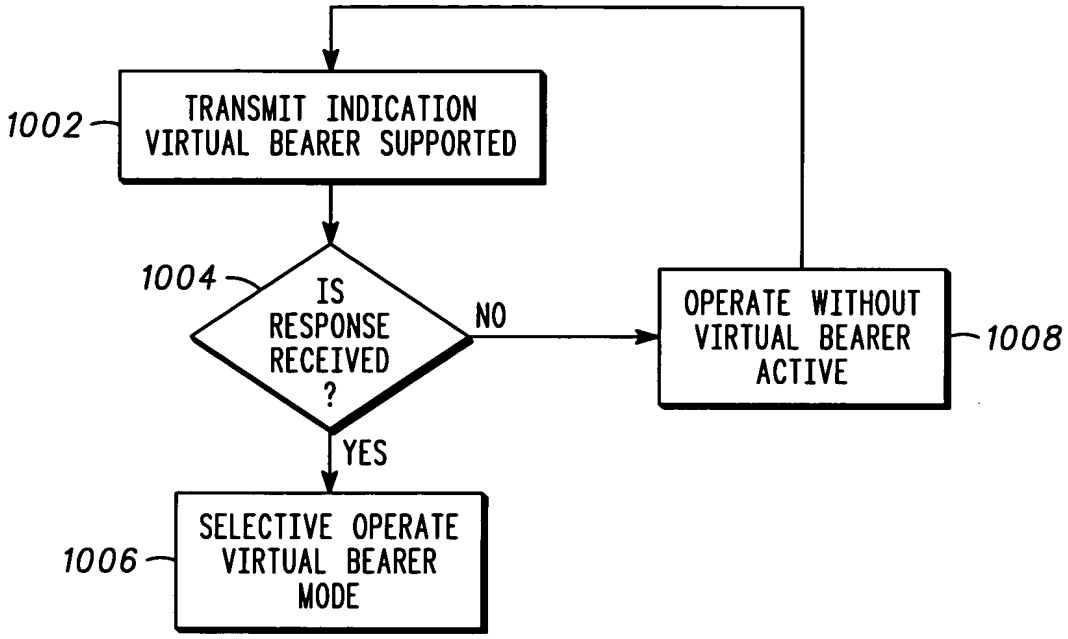

FIG. 10A

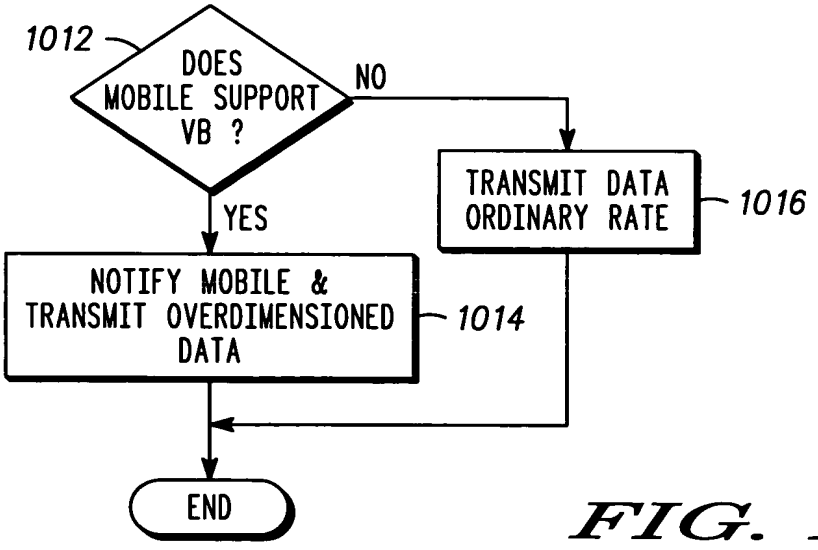

FIG. 10B

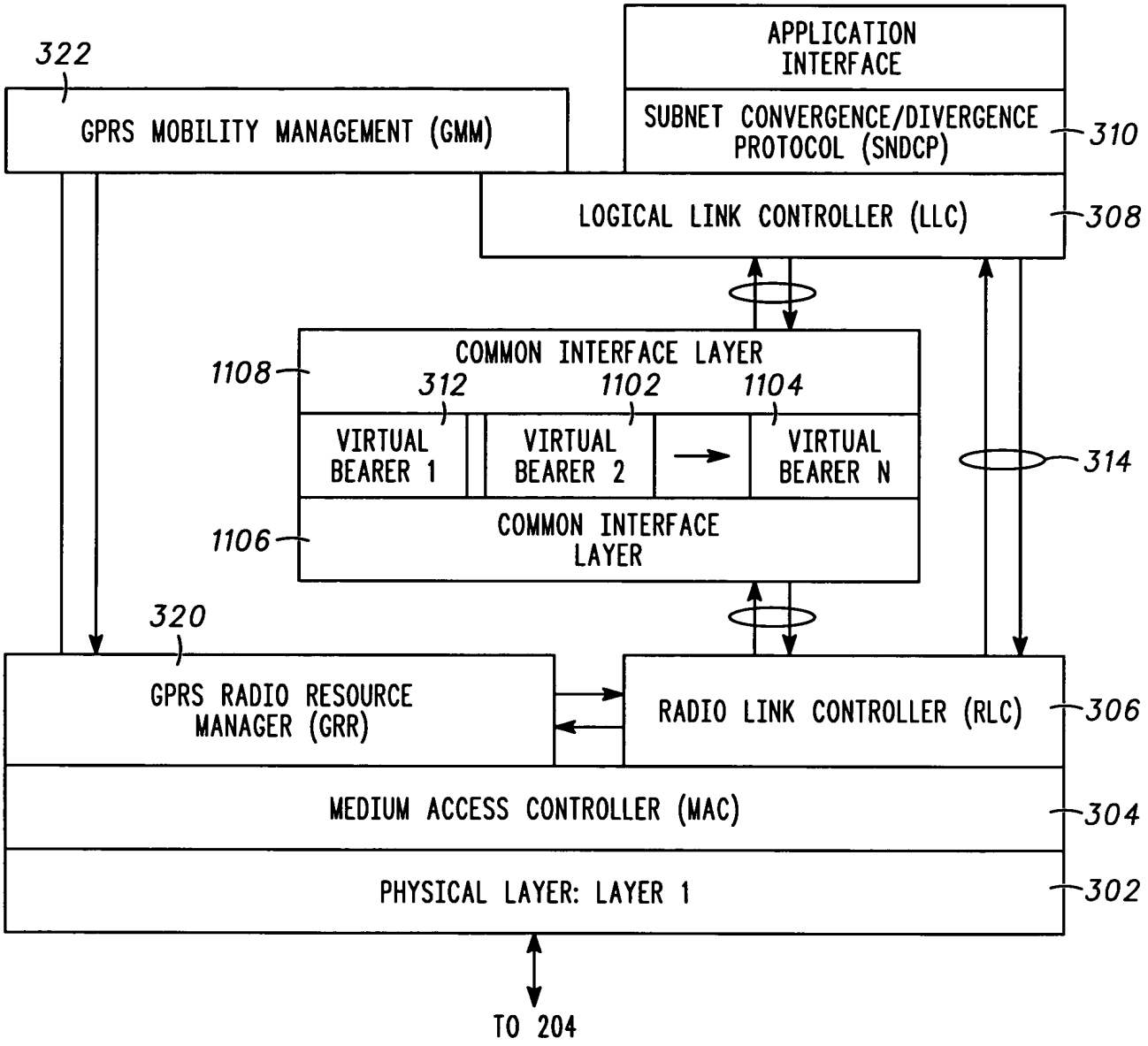
322
APPLICATION INTERFACE
GPRS MOBILITY MANAGEMENT (GMM)
SUBNET CONVERGENCE/DIVERGENCE PROTOCOL (SNDCP)
310
LOGICAL LINK CONTROLLER (LLC)
308
1108
COMMON INTERFACE LAYER
312
1102
1104
VIRTUAL BEARER 1
VIRTUAL BEARER 2
VIRTUAL BEARER N
314
1106
COMMON INTERFACE LAYER
320
GPRS RADIO RESOURCE MANAGER (GRR)
RADIO LINK CONTROLLER (RLC)
306
MEDIUM ACCESS CONTROLLER (MAC)
304
PHYSICAL LAYER: LAYER 1
302
TO 204

FIG. 11

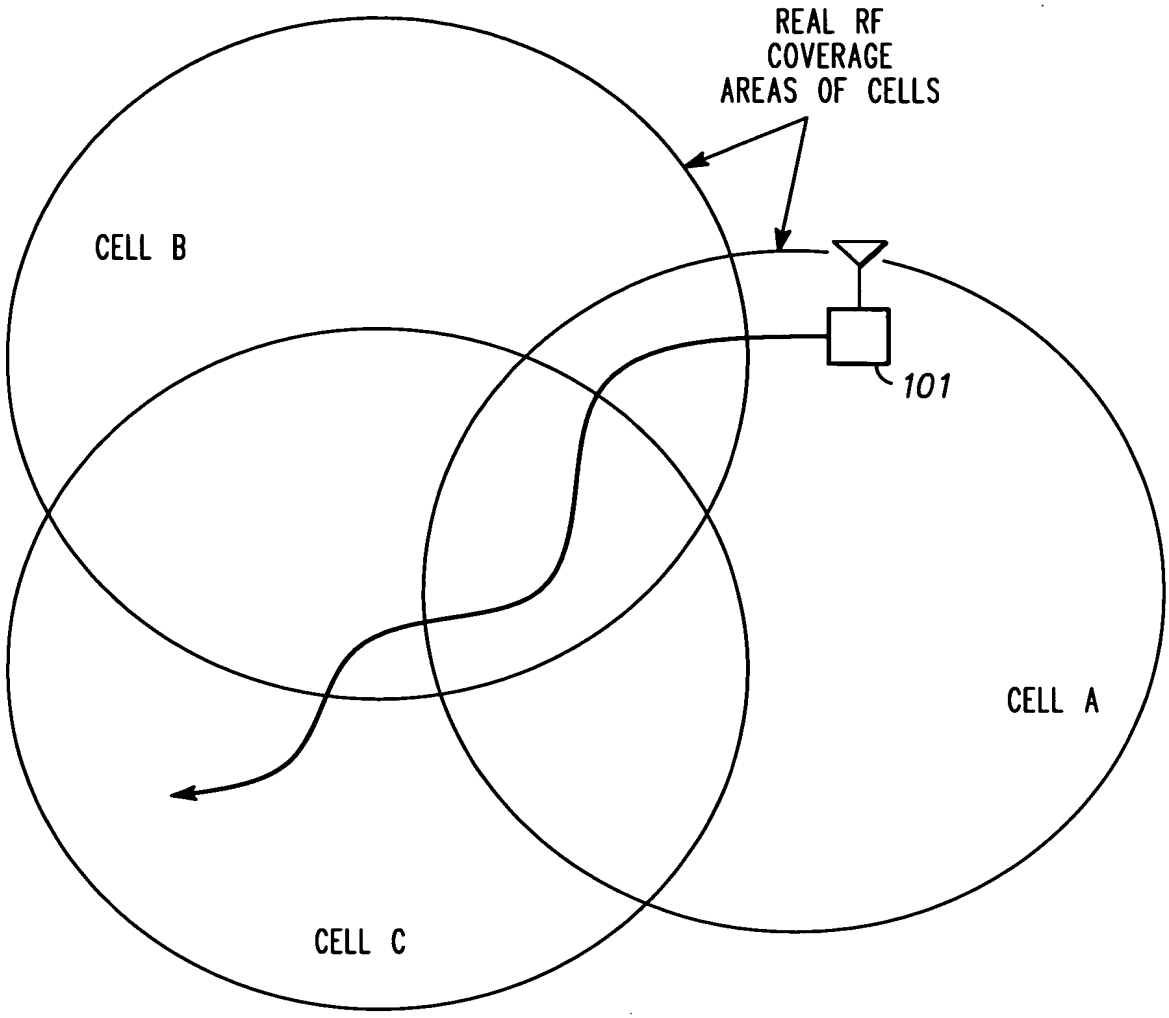

FIG. 12

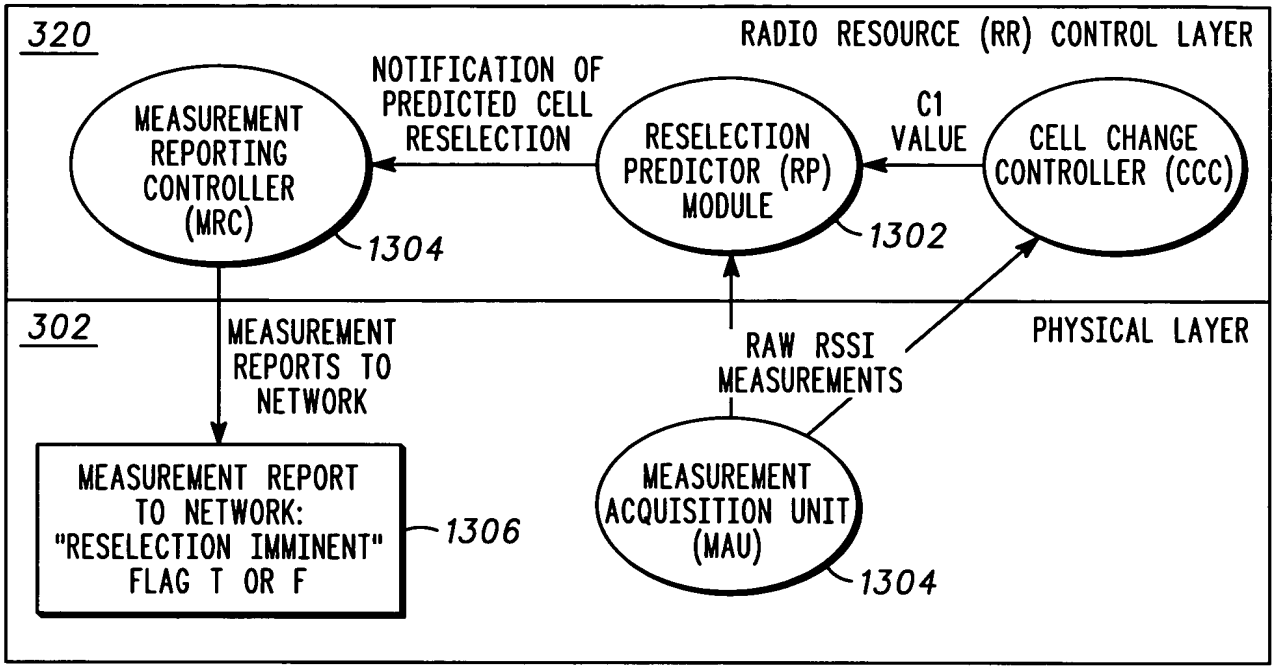
320
RADIO RESOURCE (RR) CONTROL LAYER
MEASUREMENT REPORTING CONTROLLER (MRC)
1304
NOTIFICATION OF PREDICTED CELL RESELECTION
RESELECTION PREDICTOR (RP) MODULE
1302
C1 VALUE
CELL CHANGE CONTROLLER (CCC)
302
PHYSICAL LAYER
MEASUREMENT REPORTS TO NETWORK
RAW RSSI MEASUREMENTS
MEASUREMENT REPORT TO NETWORK: "RESELECTION IMMINENT" FLAG T OR F
1306
MEASUREMENT ACQUISITION UNIT (MAU)
1304

FIG. 13

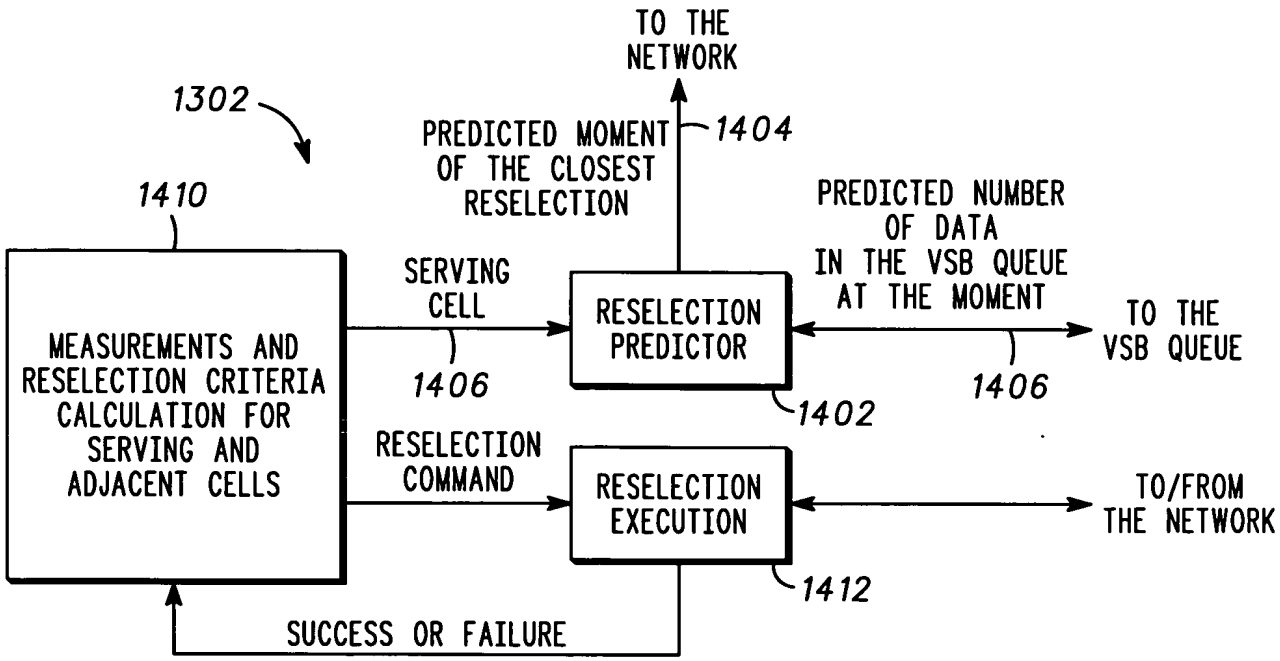
1302
TO THE NETWORK
PREDICTED MOMENT OF THE CLOSEST RESELECTION
1404
1410
PREDICTED NUMBER OF DATA IN THE VSB QUEUE AT THE MOMENT
SERVING CELL
RESELECTION PREDICTOR
TO THE VSB QUEUE
MEASUREMENTS AND RESELECTION CRITERIA CALCULATION FOR SERVING AND ADJACENT CELLS
1406
1406
1402
RESELECTION COMMAND
RESELECTION EXECUTION
TO/FROM THE NETWORK
1412
SUCCESS OR FAILURE

FIG. 14

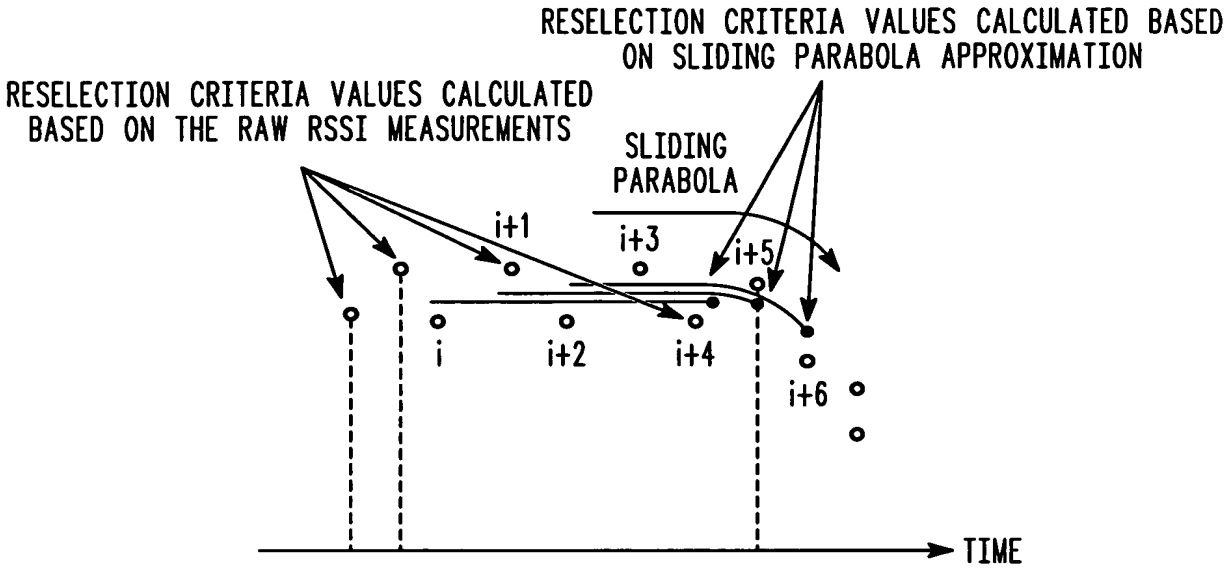
RESELECTION CRITERIA VALUES CALCULATED BASED ON SLIDING PARABOLA APPROXIMATION
RESELECTION CRITERIA VALUES CALCULATED BASED ON THE RAW RSSI MEASUREMENTS
SLIDING PARABOLA
i
i+1
i+2
i+3
i+4
i+5
i+6
TIME

FIG. 15

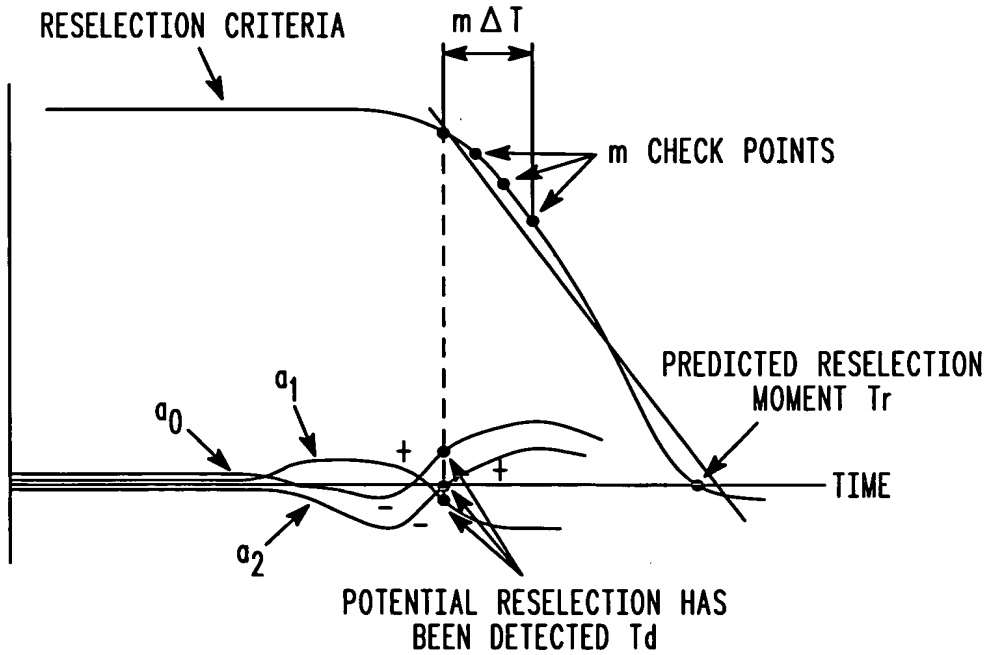
RESELECTION CRITERIA
m ΔT
m CHECK POINTS
PREDICTED RESELECTION MOMENT Tr
a_0
a_1
a_2
+
+
−
−
TIME
POTENTIAL RESELECTION HAS BEEN DETECTED Td

FIG. 16